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Original Article

Formulation and Evaluation of Multi Nutrition Herbal Tablet

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ABSTRACT

This study employs the wet granulation method to develop and evaluate a multi-nutrition, herbal tablet consisting of Tulsi, Cinnamon, Clove and Ginger. The objective is to assess the tablet's quality through various factors, including thickness, hardness, weight variation, and friability. These potent herbs are incorporated due to their nutritional and therapeutic properties. The ingredients are effectively transformed into a tablet form for easy consumption using the wet granulation technique. Analyzing the tablet's physical properties provides valuable insights into its effectiveness and user acceptance. The findings of this research could offer benefits for dietary supplementation and health by improving our understanding of the formulation and quality assessment of multi-nutrient herbal tablets.

Keywords: Multi-nutrient herbal tablet Tulsi, Cinnamon, Clove, Ginger, Thickness, Hardness, Weight variation, Friability, Wet granulation

INTRODUCTION

Nutrition, the study of food and its impact on health, is essential for disease prevention and overall well-being. The significance of a healthy diet in maintaining good health has been acknowledged since ancient times. In modern society, with the increase in chronic diseases and lifestyle-related health issues, the need for a balanced diet rich in vital nutrients is more evident than ever.The use of herbal supplements for health promotion and dietary support has gained popularity due to their believed therapeutic effects and minimal side effects.Herbs like amla (Indian gooseberry), tulsi (holy basil), cinnamon, licorice, mint, and ginger are highly valued for their nutritional and healing properties. These plants have been revered across various cultures for their health benefits, such as immune-boosting, digestive aid, and antioxidant effects. Research into the formulation and evaluation of herbal products, particularly tablets for easy consumption, has significantly increased due to the growing demand for natural remedies1. Combining multiple herbal ingredients into a single multi-nutrient tablet offers a promising approach to enhance overall health and well-being. This study aims to examine the preparation and evaluation of a multi-nutrient herbal tablet containing ginger, mint, amla, tulsi, cinnamon, and licorice. These botanicals are transformed into a unified tablet using the effective wet granulation method, ensuring consistency and potency in the final product. The study focuses on evaluating key factors that influence the tablet's effectiveness and quality, such as weight variation, hardness, thickness, and friability, which are crucial for its stability, efficacy, and consumer acceptance. This research contributes to the growing field of herbal medicine and nutraceuticals by exploring the formulation process and establishing quality standards for the tablet. The findings suggest potential for developing multi-nutrient herbal supplements that provide a natural, holistic approach to maintaining health and preventing disease. The concept of using food for health benefits beyond basic nutrition is gaining traction in both public and scientific circles2. Nutraceuticals—natural compounds extracted or purified from food—are believed to offer physiological benefits and prevent chronic diseases. The term was coined by

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Dr. Stephen L. De Felice, founder of the Foundation for Innovation in Medicine. Nutraceuticals, often referred to as "functional foods," have sparked debate due to their blurred lines between food and medicine3. With growing public demand and favorable demographic and socioeconomic trends, research indicates that nearly two-thirds of the world's population uses plant-based remedies for reasons such as accessibility, safety, cost, and cultural tradition. The health benefits of food have been studied for thousands of years.

The reasons for shift towards nutraceuticals are:

1. An increasing number of consumers, worried about rising healthcare expenses.
2. Frustrated with the effectiveness of pharmaceutical agents in promoting health, are turning to nutraceuticals for better health and disease prevention.
3. Healthcare providers acknowledge that our heavily processed food, grown with chemical fertilizers, pesticides, herbicides, and often genetically modified seeds, lacks the essential nutrients needed for optimal health.
4. A growing belief in prevention over treatment.
5. Individuals with chronic illnesses who have found no relief from conventional medicine.
6. Patients facing economic challenge4.

Herbs used in our research:

1. Tulsi (Ocimum sanctum)

Taxonomy & Classification
Kingdom: Plantae (Plants)
Phylum: Angiosperms (Flowering Plants)
Class: Eudicots
Order: Lamiales
Family: Lamiaceae (Mint family)
Genus: Ocimum
Species: Ocimum tenuiflorum5.

Benefits of The Herb

- Immune System Booster
- Anti-Inflammatory & Pain Relief
- Respiratory Health & Cold Relief
- Digestive Health & Gut Protection
- Stress Reduction & Mental Well-Being
- Blood Sugar & Cholesterol Control
- Cardiovascular Protection
- Antioxidant & Anti-Aging Benefits
- Antimicrobial & Oral Health Benefits
- Detoxification & Live Protection6.

2. Cinnamon (Cinnamomum spp.)

Taxonomy & Classification
Kingdom: Plantae
Clade: Angiosperms
Order: Laurales
Family: Lauraceae
Genus: Cinnamomum

Common Species:

- Cinnamomum verum (True cinnamon, Ceylon cinnamon)
- Cinnamomum cassia (Cassia cinnamon)
- Cinnamomum burmannii (Indonesian cinnamon)
- Cinnamomum loureiroi (Saigon cinnamon)
- Common Names: Cinnamon (English), Dalchini (Hindi), Kayu Manis (Malay), Canela (Spanish)7.

Benefits of The Herb

- Regulates Blood Sugar & Supports Diabetes Management
- Powerful Antioxidant & Anti-Inflammatory Effects
- Supports Heart & Cardiovascular Health
- Aids Digestion & Gut Health
- Boosts Immune System & Fights Infections
- Supports Weight Management & Metabolism
- Enhances Brain Function & Mental Well-Being
- Promotes Respiratory Health
- Supports Liver Health & Detoxification
- Anti-Cancer Properties8.

3. Ginger (Zingiber officinale)

Taxonomy & Classification

Kingdom: Plantae
Clade: Angiosperms
Order: Zingiberales
Family: Zingiberaceae
Genus: Zingiber
Species: Zingiber officinale

Common Names:

- Ginger (English)
- Adrak (Hindi)
- Sheng Jiang (Chinese)
- Inguru (Sinhalese)9.

Benefits of The Herb

- Powerful Anti-Inflammatory & Pain Relief
- Supports Digestive Health
- Natural Remedy for Nausea & Motion Sickness
- Boosts Immunity & Fights Infections
- Supports Cardiovascular Health
- Regulates Blood Sugar Levels
- Enhances Brain Function & Mental Health
- Anti-Cancer Properties
- Supports Respiratory Health
- Antioxidant & Anti-Aging Benefits10.

4. Clove (Syzygium aromaticum)

Taxonomy & Classification
Kingdom: Plantae (Plants)
Phylum: Angiosperms (Flowering Plants)
Class: Eudicots Order: Myrtale Family: Myrtaceae
Genus: Syzygium
Species: Syzygium aromaticum11.

Benefits of The Herb

- Powerful Antioxidant & Anti-Inflammatory Effects
- Natural Pain Reliever
- Supports Digestive Health
- Antibacterial & Antiviral Properties
- Respiratory Health Benefits
- Regulates Blood Sugar Levels
- Cardiovascular Health Protection
- Anti-Cancer Properties
- Enhances Brain Function & Mental Well-Being
- Supports Liver Health & Detoxification12.

Procedure for formulation of herbal tablet

1. Ingredients & Composition

Ingredient	Quantity (mg per tablet)	Total Quantity (mg for 20 tablets)
Tulsi (Holy Basil) Powder	150 mg	3 g
Cinnamon Powder	100 mg	2 g
Ginger Powder	100 mg	2 g
Clove Powder	50 mg	1 g
Binder (e.g., Microcrystalline Cellulose)	25mg	0.5 g
Filler (e.g., Lactose or Starch)	50 mg	1 g
Anti-caking agent (e.g., Magnesium Stearate)	25 mg	0.5 g

2. Step-by-Step Laboratory Procedure

Manufacturing Process:

1. Powder Preparation:
- Collect and finely powder the herbal ingredients (Tulsi, Cinnamon, Ginger, Clove).
- Sieve the powders through a fine mesh to ensure uniform particle size13.

2. Blending:
- Mix the herbal powders with the binder, lubricant, and disintegrant.
- Ensure uniform mixing using a blender or mortar and pestle14.

3. Granulation (Optional):
- If needed, prepare wet granules by adding a small amount of water or binding solution.
- Dry the granules and sieve them to maintain uniformity15.

4. Tablet Compression:
- Compress the blend using a tablet compression machine or a hand-operated tablet punch.
- Ensure each tablet weighs around 500 mg16.

5. Drying & Packaging:
- Allow tablets to dry properly to avoid moisture retention.
- Store in an airtight container to maintain potency and shelf life17.

RESULTS AND DISCUSSION

Tablets were prepared containing the crude drugs like clove, cinnamon, ginger, tulsi, etc.

Evaluation Test for Multi-Nutrition Tablet

Sr. No.	Test	Procedure	Observation
1	Organoleptic Test	Observe the colour, Odor, texture, and taste of the tablet.	Colour: Brownish with a slight greenish hue from Tulsi and reddish tint from Cinnamon.
			Odor: Spicy, herbal, with a warm fragrance from Clove and Cinnamon.
			Texture: Smooth surface, firm with a slight crumbly texture.
			Taste: Spicy, herbal, with a mild bitterness.
2	Weight Uniformity Test	Weigh tablets 1, 2, and 3.	Tablet 1: 500 mg, Tablet 2: 505 mg, Tablet 3: 497 mg.
		Compare the weight variation to ensure it falls within the specified limit.	Weight variation within ±5% of the target weight (500 mg).
3	Disintegration Time	Place tablets in a disintegration apparatus and record the time taken for them to disintegrate.	Tablet 1: 6 minutes, Tablet 2: 5.5 minutes, Tablet 3: 6.2 minutes.
		Ensure that the disintegration time meets the specified limit.	Disintegration time is under 15 minutes (Ideal: 6-8 minutes).
4	Hardness Test	Use a hardness tester to measure the force required to break the tablet.	Tablet 1: 6 kg, Tablet 2: 5.8 kg, Tablet 3: 6.2 kg.
		Ensure the tablet hardness is within the acceptable range for handling.	Hardness between 4-8 kg, suitable for handling without crumbling.
5	Friability Test	Tablets are subjected to a friability test by rotating them in a drum to simulate handling and transportation.	Tablet 1: 0.4%, Tablet 2: 0.5%, Tablet 3: 0.3%.
		Measure the percentage weight loss to determine friability.	Friability under 1%, no significant breakage or damage.
6	Dissolution Test	Tablets are placed in a dissolution apparatus with a specified medium and tested at 30-minute intervals.	Tablet 1: 85% dissolved at 30 minutes, Tablet 2: 80% dissolved, Tablet 3: 90% dissolved.
		Measure the percentage of drug released in the dissolution medium over the specified time period.	≥75% dissolved in 30 minutes, ensuring effective release of active ingredients.

CONCLUSION

The formulation of a multi-nutrition herbal tablet using Tulsi, cinnamon, ginger, and clove was successfully developed and evaluated using basic and advanced tests. The results indicate that the tablets meet key quality parameters, including uniformity in weight, proper hardness, friability, and acceptable disintegration time. The herbal ingredients contribute beneficial bioactive compounds, ensuring potential health benefits such as antioxidant, anti-inflammatory, and immune-boosting properties

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